CHAPTER 7

UTILITIES

Troy Wastewater Treatment Plant
1400 Dye Mill Road

INTRODUCTION

This chapter presents an overview of the current utility services as provided by the City and other private utilities to Troy and its surrounds. The location and capability of utility infrastructure are two of the most important factors linking what types of future development can be supported, to what degree, at what locations, or with what modifications.

CITY OF TROY PUBLIC WORKS DEPARTMENT

The Public Works Department is comprised of 3 divisions: Operations, Utilities, and Engineering, totaling 76 full-time employees, who are responsible for providing safe drinking water, wastewater treatment, distribution and collection services, solid waste and recycling services, vehicle and equipment fleet maintenance, and street maintenance. The Utilities Division is the largest with 38 employees.

The Utilities Division operations are funded with water and sewer rate revenues. Troy's water and sewer rates and quality of services are very competitive compared to other cities in the Miami Valley area.

A 2004 City of Englewood study of 65-70 local communities showed that Troy's average quarterly charge for water was $85.38, compared to $85.14 for Piqua and $91.95 for West Milton. The survey range was $30.75 (Enon) to $195.91 (Jefferson Water Authority I). The range of rates reflects the disparity of utilities ranging in size from Dayton ($44.62) to small county or village systems. The smaller systems are often served by package-type wastewater plants and provide water service that itself can vary from non-softened waters to Troy's lime-softened supply, which is one of the softest water supplied in the Miami Valley. Average quarterly water cost for all those surveyed is $75.90. Troy's average quarterly charge for sewer was $75.84 compared to $93.03 for Piqua and $120.75 for West Milton. The survey range was $45.51 (West Carrollton) to $136.83 (Greene County). Average quarterly sewer cost for all those surveyed is $89.52. Troy's combined water and sewer rate of $161.22 was also lower than Piqua ($178.17) and West Milton ($212.70). The average of those surveyed was $162.82, with the lowest combined cost for water and sewer for the same utility being Dayton at $94.28, and the most expensive being Washington CH at $253.20, reflecting those variables discussed above. Rates were in effect as of March 1, 2004, for quarterly consumption of 3000 CF of usage.

Troy sells water and sewer services to Miami County and through the County agreement to West Milton. There are about 1368 water accounts and 1233 sewer accounts serviced by the Miami County Sanitary Engineer in which Troy provides water

or sewage treatment for through 20-year agreements between the City Council and County Commissioners dated 2003 and 1988 respectively. West Milton's average water consumption is approximately 0.4 MGD (December 2003 through August 2004).

WATER SUPPLY AND TREATMENT

A community's existence and ability to grow is contingent upon having adequate quantities of safe drinking water, and having a water system capable of supporting fire protection needs.

Troy obtains its public drinking water supply from buried valley sand and gravel aquifers associated with the Great Miami River. The City currently utilizes ten gravel-packed production wells to draw water from the buried-valley aquifer for treatment at the Water Treatment Plant. Five each of these wells are located either at the Miami Shores Golf Course or in the vicinity of the Troy Community Park/Stadium/Hobart Arena areas adjacent to the Great Miami River. The wells range from 68 to 124 feet in depth; with screen diameters of 14 to 25 inches; gravel packs averaging 4-6"; and produce 0.9-1.8 MGD.

The raw well water is pumped to the Water Treatment Plant (WTP) at 300 E. Staunton Road where it is softened, clarified, disinfected, and filtered prior to being pumped to approximately 28,000 water customers on approximately 9200 accounts. The mission of the Troy Water Treatment Plant is to provide an adequate supply of safe and aesthetically pleasing drinking water, complying with all Federal and State of Ohio health standards.

After treatment, water is maintained at a sufficient pressure for residential, commercial, industrial, and fire fighting purposes. The City currently pumps approximately 5.3 million gallons of water each day to the distribution system (through July 2004), with the recorded one day peak consumption being 7.45 million gallons (July 8, 2002).

In 1971, an 8 MGD, lime-softening Water Treatment Plant was constructed near the original 1937 lime-softening plant. In 1999, a multi-phased expansion project was completed to allow for a future treatment capacity of up to 16 million gallons per day. This project included a four million gallon clear well and new power station (1997); four filters, two clarifiers, pump station, and a chemical feed system (1999).

In recognition of the City's commitment to providing excellent water to its consumers, in May of 2000, Troy received one of only five annual Outstanding Public Water Systems awards from the Ohio Environmental Protection Agency. This annual recognition is only given to public drinking water systems maintaining 100% compliance with the Safe Drinking Water Standards, the Safe Drinking Water Act, and requirements of the Ohio Drinking Water Laws.

Future planned improvements include siting several new wells, completing the 2004 addition of generation equipment to provide emergency electrical power to the WTP and several existing wells, and adding a booster station to better service the pressure needs of the far northwest quadrant of the distribution system.

In conjunction with the Troy Fire Department, the Troy water system has jointly earned an “Insurance Services of Ohio” (ISO) rating of 4, which is a very good rating for a community the size of Troy, on a scale ranging from 1 to 10. Very few communities can earn a 1 or 2 rating under the stringent review process involved evaluating fire departments for staffing, training, equipment, notification systems, response capabilities and water systems’ water supply, distribution system and storage, redundant systems, duration for maintaining fire flows and pressures, training, etc.

GROUNDWATER PROTECTION

Troy completed its wellhead protection program development in 1994. Figure 7-1, located at the end of this chapter, shows the Wellhead Protection areas in Troy. The map includes the modeled 1-year and 5-year time of travel boundaries, which, based on computer modeling under conservative conditions, shows that a drop of water falling on the land surface at these boundaries, along with potential contaminate molecules could migrate and be captured by one of Troy’s present 10 production wells. Potential contaminate sites were located and studied, then ranked as high, medium or low for additional monitoring and study. The time of travel boundaries were used to enact overlay protection zones, called WO – Wellhead Operation district and WP – Well Field Protection district overlay zoning districts that are depicted on the Troy Zoning Map (Figure 9-1), located at the end of Chapter 9.

The "WP" Well Field Protection Overlay District, as regulated by Section 1000.12570 of the Zoning Code, is designed to safeguard the public health, safety, and welfare of citizens and institutions that are customers of the City’s water system. This is done through regulation of the land use, storage, handling, use, and production of regulated substances. The intent of this designation is to protect the community's potable water supply against contamination. These regulations prohibit uses such as sanitary landfills, landfills composed of demolition debris, and dry wells. In addition, activities such as excavation, extraction, mining, or processing of sand, gravel, and limestone require approval by the Board of Zoning Appeals. In addition, owners and operators within the "WP" Well Field Protection Overlay District are required to implement best management practices (BMPs) to reduce the risk of release and pollution of the environment.

WATER DISTRIBUTION SYSTEM

The City of Troy also owns and operates three elevated storage tanks (water towers). The 1 MG Herrlinger Tower is located on the east side of Union Street at Herrlinger Park; the 0.5 MG Stanfield Tower is located on the south side of Stanfied Road, near Olympic Drive; and the 2 MG Barnhart Tower is located on the west side of Barnhart Road south of West Market Street (aka State Route 55). These towers can store up to 1 MG on the Low Service distribution zone, and 2.5 MG on the High Service zone, for a total of 3.5 million gallons of water.

Troy's water distribution system is currently separated into two zones known as Low Service and High Service. Low Service (LS) covers the older, lower-lying portion of Troy between the Great Miami River, Ridge Avenue and extends southward and eastward to the corporation lines. High Service (HS) covers the area northeast of the Great Miami River, west of Ridge Avenue, and feeds the points of connection where Troy provides water under agreement to Miami County areas north and southwest of the City's limits, and to West Milton. Pressures range between approximately 50 and 65 PSI in the LS zone, and between 40 and 90 PSI in the present HS zone.

The northwestern most section of the High Service (HS) zone will be separated in late 2004/2005 to create a booster station equipped "Extra High Service" (EHS) zone to elevate pressures in this area to a range of 50-70 psi by drawing suction from HS.

Figure 7-2, the "Troy Area Water District," shows the generalized water distribution system for the City, including existing trunk mains and water storage facilities locations.

The majority of the distribution system is comprised of 6-inch through 12-inch piping. There are minor areas of predominantly older neighborhoods serviced by less than 6-inch mains which are for the most part looped and therefore provide adequate service to such areas. There are also larger trunk lines (16-inch to 24-inch) which connect major sections of the City.

The Water Distribution section of the Utilities Division is responsible for maintaining, testing, and repairing 116 miles of water mains buried beneath Troy's streets, including 1126 fire hydrants located in the City**.** This unit is also responsible for reading and maintaining over 9200 water meters each month. Troy has cast iron pipe dating to 1884 or earlier still in service and in good condition due in part to the quality of the water treatment.

As Troy has grown, its water usage has increased over the years due to the increase in the amount of new development from residential to industrial uses, and on a lesser scale, due to changes in residential water use with the addition of lawn irrigation, hot-

tubs and other water-using appliances. At the time, associated improvements in well supply, treatment, distribution and storage have taken place. As population and commercial/industrial development continues, the demand for water and fire protection will increase. Given the current design capacities, the existing treatment plant, ground and elevated storage, and pumping facilities Troy can meet anticipated demands well into the future with minimal effort. Water revenues are sufficient to maintain an excellent bond rating for borrowing purposes and to support the needs of the water operations.

STORM WATER MANAGEMENT

The storm water management system and how it is designed, operated, and managed is directly related to flooding and flood control. The storm water management system plays an important role in controlling discharge to minimize flooding potential within drainage areas.

Troy's storm water drainage and detention system is both natural and man-made. It is comprised of a network of storm sewers, creeks/ditches, and storm water management ponds. Troy adopted a storm water management ordinance in 1982.

The Sewer Maintenance unit of the Utilities Division is responsible for maintaining and repairing nearly 70 miles of storm sewer (6 inches through 60 inches), all manholes, and all storm water catch basins. Crews use advanced technology to clean (jet-vac equipment) and inspect (internal video) storm sewers so that they function adequately and convey storm flows to ditches and eventually to the Great Miami River. Staff is also involved in maintaining some of the improved drainage ditches in Troy. The storm water collection system also includes two lift stations built in the mid-1970s in response to particular flooding problems and safety access. The first is located at the Race Drive Underpass under the CSX, where the storm sewer system is located above the underpass street elevations, and where the underpass was lowered for emergency vehicle access to the eastern end of Troy. The second is on North Madison Street where storm water from the adjacent neighborhood must be lifted into the Morgan Ditch, an open channel out-letting to the nearby GMR.

Despite the capabilities of Troy's existing storm water management system, larger storms sometimes result in yard and street flooding. To minimize existing and anticipated flooding due to excessive storm discharge, Troy has implemented well over $4 million in major, phased improvements in various areas of the City and in Staunton Township. These improvements are to better accommodate flood flows and reduce nuisance flooding within the living levels in homes near the Kidder Ditch in the northeast portion of the City. Refer to Chapter 6, Physical Characteristics, Drainage, for additional information.

The City also experiences flooding hazards within natural floodplains running along and proximate to the Great Miami River. To mitigate this type of flooding, Troy and

neighboring communities participate in the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP).

WASTEWATER COLLECTION AND TREATMENT

The wastewater collection and treatment system is essential to insuring the health and welfare of the community's environment and to support current and future needs. A central system is used to collect, treat, and dispose of the wastewater at a low risk to environmental hazards.

The Troy Wastewater Treatment Plant (WWTP) is located at 1400 Dye Mill Road. The first treatment plant began operation on this site in 1939. Subsequent improvements took place in the early 1950s and early 1960s, and in 1974 the plant underwent a major overhaul, creating the basis for the present WWTP operating as a conventional activated sludge plant in the contact stabilization mode. Between 1995 and 2002 the City completed a series of phased expansions, adding a 2-stage screw pump station and equalization tanks, power station upgrade, additional secondary clarification, ultraviolet disinfection, and installed odor control technology on its biosolids treatment process. Future planned improvements include expanding primary clarification and activated sludge aeration processes, as may be dictated by system demands or regulatory changes, including a possibility for enhanced removal of nutrients such as phosphorous and nitrogen. When completed, these phased improvements will allow the WWTP to treat an average daily flow of 9.8 million gallons of wastewater.

The WWTP provides treatment to all industrial and domestic users of water within the City of Troy and certain surrounding areas of Miami County, where the City sells service to Miami County through an agreement. The WWTP treated an average of 5.73 million gallons of wastewater per day in 2001, 6.59 MGD in 2003, and over the period of January 2003 through August 2004 averaged 6.19 MGD. Discharge is to the Great Miami River. The Plant has a current NPDES permitted treatment capacity of 7 million gallons per day. The highest, recent hydraulic load on the WWTP was recorded July 7, 2003 at 16.89 MG.

The WWTP is well-positioned to accommodate present users. The future expansion noted above will allow the WWTP to handle increasing hydraulic and biologic loads well into the future.

Figure 7-3, located at the end of this chapter, illustrates the "Troy Area Sewer District". All wastewater is collected and moved through this system of sewer mains. Several pump or lift stations exist in the collection system due to the topography of the City, with the main lift station being located at the POTW (Publicly Owned Treatment Works, OEPA terminology) or WWTP. Lift stations, sites where wastewater is lifted mechanically from one sewer elevation to another and allowed to proceed toward the WWTP under gravity flow, include: Fernwood, Heywood, and Dakota locations. Pump stations, sites where the wastewater must be lifted from one elevation and transported

via a force main to a higher elevation gravity sewer include: Kirk/Fairfield, Dorset, and a new pump station under construction in the Nottingham residential plat.

The Sewer Maintenance unit within the Utilities Division is responsible for inspection, maintenance and repairing over 100 miles of sanitary sewer ranging from 6 inch to 42 inch diameter mains. Crews use advanced technology to clean and inspect the sewer system to ensure efficient transportation of sewage to the Wastewater Treatment Plant. Sewer Maintenance and WWTP staff also maintain the City's two storm water lift stations. A "jet-vac" sewer cleaning machine (shown in insert) and internal video inspection of mains are keys to proper inspection and keeping sewers in good working order.

The sanitary sewer system's oldest components date to about 1903. Annual revenues and carryovers allow for sufficient funds to make needed improvements.

GROWTH CHARTS

Growth chart data for the Troy Municipal Water and Sanitary Sewer Systems is shown on the following figures found at the end of this chapter:

CHART 7-1 TROY GROWTH – UTILITIES 1965- PRESENT

- Water, sanitary and storm sewer systems miles of facilities in existence are shown in trend form indicating a steady trend of growth from 1965 to the early 1990s, of 1.1 MI/YR for water and sanitary sewer (nearly 2% annually in 1965), and 0.6 MI/YR for storm (about 1.6% annually in 1965);
- However, since the early 1990s a significant increase in growth rate is noted: 2.5 MI/YR and 2.2 MI/YR for water and sanitary sewer about 2.5% annually since 1992); and 2.0 MI/YR for storm (well over 3% annually since 1993). The water and sewer rates of added miles of facilities have approximately doubled, while the storm sewer installation rate has increased roughly 3 times over the 38 year period, reflecting the added requirements for storm sewer installations due to flatter topography and slope in the newer development areas of Troy.

CHART 7-2 TROY GROWTH – AREA OF THE CITY 1965-PRESENT

- The area inside the corporate limits of Troy is shown in trend form from 1965 to the present;
- Mid-1960 and most of the 1970s saw a 0.2 square mile per year average growth (about 5% annually). That rate dropped by half to 0.1 square mile per year until about 1999 (about 1.5% annually). Growth since then – albeit relying on limited data – would indicate that growth has significantly increased to an average rate of 0.5 square miles per year. Only future data will prove if this trend is sustained or whether a few large annexations such as "Goodrich-Robinson" and "WACO" have skewed the trend over a short period of time;

CHART 7-3 TROY GROWTH – STREETS 1965-PRESENT

- Street, sidewalk and curb miles are shown in trend form from 1965 to present;
- Streets and sidewalk mileages are increasing at a rate of about 1.1 miles per year throughout the period; while curbs increased at a rate of over 1.4 miles per year from 1965 through 1994, and has increased to nearly 4 miles per year since, due in part to several significant street improvement efforts;
- Rates of increase have averaged about 1.5% generally for all street improvements and additions, except for the recent rise in curbs indicating over a 2.5% growth rate annually since 1994;

TABLE 7-1 TROY GROWTH STATISTICS CHART 1965-PRESENT

- Table 7-1 itemizes the data used to create the prior trend charts.

ELECTRICITY, GAS AND TELEPHONE SERVICES

In Troy, private companies operate most public utilities other than the municipal water and sewer systems. These include power companies that supply natural gas and electric, and numerous telecommunications providers. Telephone and data service is also provided by some companies that do not use standard distribution wires, but have microwave or radio technology such as cell phones operated from broadcast towers. The principal providers of traditional public utilities are listed below.

Dayton Power and Light Company

Dayton Power & Light Company (DP&L) is the principal subsidiary of DPL Inc. DP&L delivers electricity to 500,000 customers in 24 counties of West Central Ohio.

Pioneer Rural Electric Cooperative

Pioneer Electric Cooperative is a not for profit consumer-owned electric utility delivering electric needs to nearly 16,000 member-owners in Miami, Champaign, and Shelby counties in Ohio.

Vectren Corporation

Vectren Corporation supplies natural gas service in Troy and the rest of Miami County. This diversified energy and applied technology company serves 953,000 customers in Ohio and Indiana. Vectren offers energy conservation and planning services to Troy customers at its Troy office on Experiment Farm Road.

Verizon

Verizon provides telephone service in the greater Troy area. Verizon offers high-speed data transmission over fiber optic telephone lines. Also provided are network-consulting services, data consulting services, architects and builder's service/building wiring, and sales and service on both leased and direct sales telephone systems.

Time-Warner

Time-Warner provides cable TV and broadband telecommunications service in Troy and surrounding counties. Service is generally available in most residential areas. Rural areas and industrial parks with few potential customers often do not have a nearby cable line available. Most residential areas of the city are served.